

IN THE CLAIMS

1. A method for controlling the movement of datapackets in a hierarchical network, the method comprising the steps
5 of:

using a class-based queue traffic shaper to enforce a plurality of service-level agreement policies on individual connection sessions by limiting a maximum data throughput for each connection in a hierarchical network;

10 distinguishing in said class-based queue traffic shaper amongst datapackets according to at least of their respective source and destination IP-addresses;

15 limit checking in one clock cycle for an entire network hierarchy above a particular node to enforce said plurality of service-level agreement policies according to said respective source and destination IP-addresses.

2. The method of claim 1, further comprising the steps of:

20 associating a service-level policy that limits allowable bandwidths to particular nodes in said hierarchical network;

25 classifying datapackets moving through said hierarchical network according to a particular service-level policy; and

30 managing all datapackets moving through said hierarchical network from a single queue in which each entry includes service-level policy bandwidth allowances for every hierarchical node in said network through which a corresponding datapacket must pass.

3. The method of claim 1, further comprising the step of:

testing in parallel whether a particular datapacket should be delayed in a buffer or sent along for every
5 hierarchical node in said network through which it must pass.

4. The method of claim 1, further comprising the step of:

constructing a single queue of entries associated
10 with corresponding datapackets passing through said hierarchical network such that each entry includes a pointer to the actual packet and pointers to the corresponding hierarchical node that point to the data structure containing available bandwidth credits in said network through which a
15 corresponding datapacket must pass.

5. A means for managing the distribution of datapackets, comprising:

means for associating a service-level policy that
20 limits allowable bandwidths to particular nodes in a hierarchical network;

means for classifying datapackets moving through said hierarchical network according to a particular service-level policy; and

25 means for managing all datapackets moving through said hierarchical network from a single queue in which each entry includes service-level policy bandwidth allowances for every hierarchical node in said network through which a corresponding datapacket must pass.

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6. The means of claim 5, further comprising:

means for testing in parallel whether a particular datapacket should be delayed in a buffer or sent along for every hierarchical node in said network through which it must pass.

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7. The means of claim 5, further comprising:

means for constructing a single queue of entries associated with corresponding datapackets passing through said hierarchical network such that each entry includes a 10 pointer to the actual packet and pointers to the corresponding hierarchical node that point to the data structure containing available bandwidth credits for every hierarchical node in said network through which a corresponding datapacket must pass.

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8. A network management system, comprising:

a protocol processor providing for header inspection of datapackets circulating through a network and providing for an information output comprising at least one 20 of source IP-address, destination IP-address, port number, and application type;

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a classifier connected to receive said information output and able to associate a particular datapacket with a particular network node and a corresponding service-level policy bandwidth allowance;

a single queue comprising individual entries related to said datapackets circulating through said network, and further related to all network nodes through which each must pass; and

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a traffic-shaping cell providing for an inspection of each one of said individual entries and for outputting a single decision whether to pass through or buffer each of

said datapackets in all network nodes through which each must pass.

9. The system of claim 8, further comprising:

5 an output scheduler and marker for identifying particular ones of the individual entries in the single queue that are to be passed through or buffered.

10. The system of claim 8, wherein:

10 at least one of the protocol processor, classifier, and traffic-shaping cell, are implemented as a semiconductor intellectual property and operate at run-time with the single queue.